# Original Articles.

## A REPORT OF TWO CASES OF "TYPHOID SPINE."[1]

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SINCE 1889 several examples of a rare sequel or complication of typhoid fever have been reported under different names. That of "typhoid spine" is the one first used and possesses the advantage of not binding one to a definite theory of the underlying pathological cause. I have succeeded in finding references in the literature to twenty-one cases having some resemblance or relation to the condition first reported under this name, and to these I take pleasure in adding the histories of two others which came under my care at the Lakeside Hospital during my service as resident physician.

CASE I. J. F. C., male, age twenty-eight years, agent structural steel work; entered the Lakeside Hospital on the eighth day of his illness with typhoid fever. The attack, while not marked by extremely high temperature, was a severe one complicated by intestinal hemorrhage, relapse and furunculosis. The Widal and diazo reactions were obtained. Although there were no symptoms referable to the back during his stay in bed, it was noticed later that it was exceptionally weak and ached after the patient was allowed to sit up or walk about. There was no actual pain. The back was examined several times with entirely negative results.

The patient left on the 6th of June, 1899, after a stay of seventy days in the hospital. On the 23d of August he re-entered the hospital, complaining of pain and weakness in the lower lumbar region, and gave us the following account of his illness: For ten days after his discharge his back was weak and ached a little; then without assignable cause he began to have pain which was slight at first but increased rapidly in severity. At the beginning it was throbbing in character but later became dull. This dull pain began to be punctuated by sudden short attacks of severe pain; the sharp pains were associated with a great tendency to twitch, and any movement intensified and prolonged the attacks. The pains were somewhat more severe when the patient drew up his legs, and were a little relieved if the legs were in a horizontal position or nearly so. The duration of these attacks was usually an hour or two, with intervals of from three to four hours of comparative relief. Movement caused pain, and was very apt to bring on an attack of this kind, which, however, often began without assignable cause. The attacks were more frequent at night than in the day time, and disturbed his sleep. The localization of the pain was in the lower lumbar and sacral region or buttock; most commonly on the right side, sometimes on the left, never on both. Previous to his admission to the hospital the patient states that opiates were discontinued, because on trial they were found to have so deleterious an effect on the action of the kidneys and bowels. During the severest part of the illness the patient had periods of a few days each with normal temperature, alternating with febrile periods of similar duration in which the temperature sometimes rose to 103° F. At this time he became much emaciated and nervous, "going all to pieces" if he lost control of himself. His bowels were constipated. About four weeks before his readmission to the hospital he began to improve. The attacks of pain became less frequent and severe, the appetite improved and he gained in weight.

At entrance the appetite was good, the bowels were regular, and the pain was confined to the lower lumbar region, was dull in character, with an occasional sharp twinge. The physical examination was largely negative. The patient was somewhat emaciated; the pulse 80, regular and rhythmic; the patellar reflexes were very weak, the plantar reflex was not obtained. There was no evidence of destructive disease of the spinal column; no deformity; no tenderness over the spine or elsewhere; no indication of involvement of the sciatic or other great nerve trunk; no evidence of psoas abscess. The urine is reported not to have contained albumin; there was no diazo reaction; the sediment showed a few hyaline and fine granular casts and leucocytes. Examination of the blood revealed the presence of 5,280 leucocytes to the cubic millimetre. The Widal reaction was reported negative.

During the first month of his second stay in the hospital the patient was not kept continuously in bed, and was at times almost free from discomfort, and again suffered considerable pain in his back or in his buttock. At the end of his first month in the hospital the temperature, which had varied between 98° F. and 99° or 99.5° F., began to go up gradually, reaching its highest point, 103.6° F., on the 25th of September. The febrile period extended over two weeks. Shortly after this rise in temperature began, an examination of the blood showed 8,800 leucocytes to the cubic millimetre. On the 2d of October the spleen, which is said to have been normal in size at entrance, was felt below the costal margin, and a Widal reaction was obtained. There was no rose-rash, the abdomen was neither distended nor tympanitic. In spite of the enlargement of the spleen and the apparent recurrence of the Widal reaction, it is hard to see how this could be either a reinfection with typhoid or a relapse of that disease. At first it was not thought necessary to confine the patient strictly to his bed. The Paquelin cautery was used on several occasions, the back was strapped, and tonic remedies were employed. When the more severe pain began, antirheumatic, antineuralgic, sedative and hypnotic remedies were employed, with opiates when necessary. The case progressed without the aid of any mechanical contrivances aside from the

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very inadequate one of adhesive straps. When the patient was in bed with severe pain, with a view to determine whether relief would be afforded by the use of extension by weight and pulley, manual extension was tried without any apparent benefit. Until perhaps the last of October there was very little change in the condition of the patient as to pain, but from that time on there seemed to be a steady, but very slow improvement in this respect. On the 2d of November he began to have a bed-rest very cautiously, and this was gradually increased, as the procedure seemed to be tolerated and the patient's strength bore it. He was discharged from the hospital on the 13th of December, 1899, the note stating that he had still some trouble with his back.

The patient was seen in July, 1901, and said that, except for two to three days about three weeks after leaving the hospital, he had no pain or ache in the back after his discharge, but that he had so much weakness in the back that he greatly feared a return of the trouble on several occasions. He did not attempt to go to work in the office until May, 1900, thirteen months from the onset of the typhoid, and, for some time after returning to the office, did very little. During all the next summer had a good deal of soreness in the back for a day or two after any misstep or overexertion, and experienced considerable difficulty in getting about on this account. At the present time he does about the same as he did before his sickness, but still has a little soreness in the back after a misstep or overexertion. He is quite certain, however, that this last is decreasing and will entirely disappear.

CASE II. J. M. H., male, age forty-two years, a salesman in a large hardware store, entered the Lakeside Hospital July 17, 1899, in the service of Dr. J. E. Cook, by whose kind permission I am permitted to report the case. Unfortunately the records of the case were not preserved, but the following history has recently been secured from the patient, a very intelligent man, and I think that the general features of the attack have not been in any way misrepresented by the loss of the original records. To Dr. Cook I am indebted for certain facts about the case not remembered by the patient or myself. He was taken ill with typhoid on the 7th of April, 1899. About seven weeks later the fever left, the course being one of only moderate severity and entirely without complications in the preliminary attack. At about the usual time after the disappearance of the fever, the patient was propped up in bed, and felt a little stitch or catch in his back such as one has at times on twisting it. This trouble increased continuously, and within twenty-four hours he was unable to turn in bed, and suffered from deep, cramp-like pain in the lower lumbar region, a little more to the right than to the left. This pain was not absolutely continuous, but came in paroxysms, which seemed to be relieved, or at least to be made more bearable, if the patient grasped the bed or some other object tightly while it persisted. After this first bed-rest and its very unpleasant sequel, he was kept flat upon his back fully ten days, and at the end of that time was so much relieved that he was again propped up in bed. The time of the bed-rest was very gradually increased, and he was allowed to put on his clothes at the end of another ten days. He was not, however, free from pain or soreness when sitting up, but when lying down he had no discomfort. There was no elevation of temperature. At the end of about two weeks the pains again began to increase, and one day when on his feet he had so severe a "cramp" that he would have fallen if it had not been for support. He thereupon took to his bed and for three or four days had some elevation of temperature.

On the 17th of July he entered the hospital. The patient was anemic, emaciated and nervous, being almost hysterical at times. There was no evidence on physical examination of a neuritis; no deformity of the spine was detected; no tenderness to deep pressure was found in either iliac region or over the painful area in the back. Tenderness over the spine developed later and was for a time very marked. There were no rectal or vesical symptoms. Fortunately I have been able to find the original record of his temperature for the first thirty-eight days of his stay in the hospital. He entered with a normal temperature, but during the first month he had febrile periods of from twelve hours to four days in duration, in which the temperature rose to 102.5° F., 103.5° F., and once to 104.7° F. They alternated with rather longer periods of normal temperature. After the first month in the hospital his temperature is supposed to have remained normal. The patient was never free from discomfort at entrance, and at relatively short intervals would have a succession of spasms of pain lasting at intervals for a day and a night, or even two days, after which he would be relatively free from them for a short time. Absolutely no cause could be assigned for the onset of these attacks, although any movement except one executed with the greatest circumspection increased his discomfort, whether he was in pain or relatively free from it at the time. For about one week from the time of entrance heat was applied to his back. During the second week cold was applied by means of an ice bag. Morphia was used throughout when it was considered necessary. Dr. J. H. Lowman saw the case in consultation during one of the attacks of pain, and suggested the use of extension by means of a weight and pulley, on finding that manual extension afforded relief. Extension was applied, and was continued intermittently for about four weeks. In spite of the fact that it afforded an appreciable amount of relief, it was not continued more than a few hours each day, since its application disturbed the patient, and it was thought desirable to allow him to turn on his side with the hope of thus avoiding bed sores. In addition to tonic remedies, potassium iodode was administered in moderate doses, and opiates were used as needed for the relief of pain. For a considerable time after entrance the prognosis was con-

sidered very grave. He was thought to have a tuberculous spondylitis. From the time of the first bed-rest till the patient was discharged from the hospital, "improved," advances were made very gradually. He had his clothes on for the first time about three weeks before he went home.

The patient was seen in July, 1901, and stated that he returned to the store in January, 1900, but did very little work for eight or nine months, and had an aching, weak back all the time. Any jar or misstep or stubbing the toe would hurt his back. It was well on in the spring of 1901 before he could lift anything at all heavy, and when seen was unable to scuffle, and felt a hurt in the back at times when "doubling up," especially before a storm. He would hesitate to lift weights greater than one hundred pounds, which was the most he was called upon to attempt, but within these limits he did anything that came his way in the hardware business. He had considered himself well for the few months preceding the time he was seen in 1901.

The case reported by Eskridge [4] is quite inaccessible, and the history is of such interest that it seems desirable to give an extended abstract in this place. E. S., male, Germany, hostler. Mother died of brain fever in the thirty-fifth year. Maternal grandfather died of hemiplegia. Family history otherwise unimportant. The patient had been a hostler for the preceding six years. For the preceding eight or nine years he had joint pains in damp weather. Five years ago he contracted syphilis. Four years ago he was lame for two months from pain in the sacral region, and the pain extended to the left side of the pelvis. Two years before the present attack he moved from his former home in Illinois to Denver. Since his stay in Colorado his joint pains seem largely to have disappeared. In July, 1892, he was admitted to the Arapahoe County Hospital suffering from an attack of typhoid fever. During his convalescence he began to complain of pain in the sacral region. At first it was simply stiffness after sitting, with some pain when he attempted to get up. This passed off after he walked about for a short time. About the middle of September he left the hospital and returned to work, but the pain in the back and the parts around the left hip became so great that he was compelled to give up work and return to the hospital. After his return to the hospital he was confined to bed on account of pain. When the patient stood both legs were straight and the gluteal folds were normal. The legs could both be abducted and adducted without pain. Extremes of flexion and extension of the left thigh caused great pain. The back was painful on pressure over the first sacral spine, and the tenderness was limited to one spinous process. Pressure here caused pain to shoot down the posterior portion of the left thigh, and in the region of the small sciatic nerve on the same side. When the left leg was straightened and brought forward, it gave rise to pain in the sacral region of the spine, in the left hip, and in the posterior portion of the left thigh. When the leg was brought backward, the pain complained of was chiefly in the sacral region of the spine. There was no paralysis or paresis of any of the muscles, the limitation of the movements of the left leg was due simply to pain. Reflexes: Knee jerks, both greatly increased; ankle clonus, absent; plantar reflexes, right fair, left more marked than right; cremaster reflex, right normal, left absent; lower abdominal reflex, absent; epigastric reflex, right present, left absent. Temperature, localization and muscular senses were all normal. A condition of slight hyperesthesia was found over the left leg, and over the space one-half the size of a quarter on the front of the right thigh there was found the condition of anesthesia. There were no other disturbances of sensation found. Pressure over both ilia at the same time, so as to press the ilia upon the sacrum at the sacro-iliac synchrondrosis, caused considerable pain in the left sacro-iliac joint, and the pain extended from one side of the pelvis to the other. The hip-joint seemed entirely free from pain. There was no tenderness over any of the nerves of the legs.

In the differential diagnosis myelitis, sciatica, hip-joint disease, tumors of the bones of the pelvis, malingering, localized pachymeningitis, and some form of bone disease were discussed. After consideration, all of the above were ruled out except the localized meningitis or the bone lesion. The meningitis if present was considered to be an affection of the external surfaces of the dura, involving the sheaths of the nerves leaving the cord, on only one side, but not involving the cord itself. Now as an external pachymeningitis so rarely occurs in the absence of bone disease, it is fair to presume that we have bone disease and pachymeningitis associated, although it is possible to explain all the symptoms without the presence of a meningitis. Meningitis, however, would not account for all the symptoms in the absence of bone disease. The pain in the left sacro-iliac synchrondrosis and the tenderness over the first sacral vertebra are due to an affection of the bone or its periosteum.

There is no statement as to the final outcome of the case, although it seems to have been well on the way to recovery when reported.

An accurate pathological diagnosis of the cases here reported is very difficult, and the same difficulty has been met by other reporters of similar conditions. This difficulty is reflected in the titles under which they have reported their cases. Although Gibney had formed a theory that the underlying pathological condition was a perispondylitis, he reported his cases, the first, so far as I know in the literature, under the title, "The Typhoid Spine." Osler, writing later, reports three cases as a neurosis. In the last three years histories of cases presenting certain points of similarity to those reported by American observers have been published in Germany as examples of typhoid spondylitis. While an exact determination of the pathological condition in a disease in which

the outcome has been uniformly favorable is practically impossible, the writer wishes to review some of the facts upon which his conclusion is based, that in a certain number of the cases reported the symptoms have been due to an inflammatory process involving one or more of the vertebræ, or their periosteum or cartilages. In so far as I have been able to collect it the literature of the subject consists at present of fifteen articles reporting twenty-one cases, the majority of which I have been able to consult at first hand. I have had access to seventeen or eighteen of the histories of these cases in the report of the observer or in a few instances in a satisfactory abstract. From the standpoint of diagnosis I wish to call attention particularly to the occurrence of deformity, and to the frequent association of fever with the affection.

As to the occurrence of deformity in eighteen cases, the records are silent on this point in six, deformity is definitely stated not to have occurred in six, but in six others there is fair evidence that a deformity was present at some time in the course. In three cases, 12, 13 and 14, a kyphosis is definitely stated to have been observed by the reporter. Könitzer,[10] in the introduction to a case he reports, remarks that a new symptom complex has been made by Quincke[9] which appears as a disease of the lumbar and sacral region after typhoid fever, causing very severe pain and swelling in these parts. This statement leads me to believe that Quincke's cases, two in number, had some deformity. I have not been able to consult his original article, and the abstract of the histories of his cases given by another writer makes no mention of deformity. In another case[11] the patient claims to have noticed a prominence in the lower lumbar region which had disappeared, however, before she was seen by the reporter. It is well known that inflammatory processes secondary to typhoid fever are usually, or at least often destructive, and it is a rather remarkable fact about these cases, if they are due to an inflammatory process, that they have in no case gone on to suppuration, nor does the deformity usually persist. In five of the cases in which a deformity was noted it disappeared in a short time, in one only being present at the time of the report. Gibney[3] has reported a case of torticollis in which there was a well-marked deformity of a number of the cervical vertebræ with an enlargement of their lateral masses in a man of forty-five who at the age of twenty-two had a febrile disease of several weeks' duration, pronounced by his physician typhoid fever, and followed by a painful affection of the cervical spine. Gibney reports, also, that a painful affection of the hip which he observed following an attack of "typho-malarial" fever left some limitation of motion. He mentions these cases as items which strengthen his belief in the correctness of his opinion that the condition is due to a low grade of inflammation. The presence of a febrile reaction associated with the condition under consideration, and not to be explained by any coexisting condition, might, doubtless, be considered, next to the appearance of a kyphosis, the most cogent reason for thinking that the underlying pathological condition was inflammatory. In a total of seventeen cases no statement is made by the reporter in this point in five, in two cases it is stated that no febrile reaction was observed. In the remaining cases, ten in number, the temperature was elevated during some portion of the affection. In two cases slight febrile reaction is reported. In the remaining eight it seems to have reached at least 103° F. at some time in its course. For these and other reasons the writer feels that the true type of the "typhoid spine" is a symptom complex due to an inflammatory process, and that pain in the back following typhoid fever but due to other conditions should not be confused with it. At least one case has been reported[12] in which there was a painful condition of the muscles of the spine, associated with degeneration, leaving behind a contraction of the muscle affected. There have also been observed cases of neurosis apparently not unlike that known as the railroad spine, although in some of these cases it is open to question whether this neurosis was the original condition or a later complication.

The prognosis of painful affections of the spine subsequent to typhoid fever, in so far as recovery is concerned, is excellent. No deaths are recorded in the literature. Even allowing the two cases reported by Gibney, one a painful affection of the cervical spine with permanent deformity, the other a similar painful affection of the hip with limitation of motion, to influence our prognosis as to deformity this is also excellent, for in no other cases in which the course has been adequately followed to determine the final outcome has any permanent deformity or limitation of motion been observed. From another standpoint the prognosis is very different. In very few cases has the trouble been of short duration. It has caused a very marked disability for weeks and more often for months, and in many cases has been characterized by a series of exacerbation arising spontaneously or brought on apparently by the most trivial causes.

In view of the probable duration of a well-developed case of typhoid spine it seems desirable to emphasize the necessity for the greatest circumspection in the management of any case which during the febrile period or during convalescence, suggests the development of the typhoid spine by the existence of a weak, aching, painful back. For a well-developed attack, relief from pain is the first requirement. This end may be attained very largely in some cases by rest in a recumbent position. Additional relief may be given by various mechanical devices affording additional support to the spinal column, as by a jacket or brace. In a similar fashion, extension may be serviceable. Later a jacket may be of further assistance in supporting the back, in reassuring the patient and in permitting him to get about at an earlier date than would otherwise be possible. For the relief of pain also antirheumatic, sedative and hypnotic remedies may be

employed, but unless the suffering is mild, opiates will be found necessary, from time to time, to make the patient's condition bearable. The use of nourishing food and of tonics will be indicated at appropriate times. Other medication seems not to be of any great value, although potassium iodine has been used in a number of cases with apparent benefit.


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## EMPYEMA IN CHILDREN.[1]


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This paper is based on a series of cases of empyema in children. Its deductions apply to children only.

Through the courtesy of Dr. Bradford, Dr. Burrell and others of the Children's Hospital staff, the writer has had an exceptional opportunity in the last two years for the study of the treatment of empyema in children. The work was begun with the idea of studying the somewhat neglected "siphon" or negative pressure treatment. To this end special apparatus was devised: (1) A hydrostatic apparatus in which the negative pressure exerted could be accurately estimated and regulated by means of a water column, the chest cavity being connected by an air-tight joint with the air reservoir of the apparatus; (2) a form of valve dressing (of sheet gutta-percha) was contrived which rendered better service mechanically than the valves previously described by various writers.

This treatment by negative pressure, carried out on a number of patients, proved of definite value in the more chronic cases, where failure to heal was really due to non-expansion of the lung; these results will be reported elsewhere. In the acute cases the results were not especially brilliant, though better rather than worse than the average.

In the course of this work the writer became interested in studying the general course of the disease, its treatment and results, and it is from this point of view that this paper has been written.

This study has been greatly helped by the permission of Dr. Bradford and Dr. Burrell to make use of the Children's Hospital records since 1885. Many of these older cases were sent out for and twenty-nine reported in person or by letter. A series of cases published by Dr. Burrell in the Children's Hospital Reports, and an unpublished series by Dr. Goldthwait, kindly placed at the writer's disposal, gave data as to end results in a number of other cases of this series. Four cases at the Infants' Hospital are also reckoned in — cases treated by the writer through the courtesy of the staff. The total is 180 cases, 45 treated by the writer and 86 verified as to end result.

There are fairly satisfactory data of 146 cases. The time elapsed in some of the later cases has been too short for final data, and to this extent the figures are subject to revision. The data have been tabulated and considered statistically, but the very varying character of the cases renders statistics rather unsatisfactory, and part of the conclusions are frankly deductions from a detailed study of individual cases which cannot be gone into here.

*Age.*—All cases were under twelve years. The youngest was seven months; 16 were under two; 67 between two and five years; 79 over five; that is, 51% were under and 49% over five years of age. The average age is 4.9 years.

*Etiology.*—The great majority of cases evidently follow lobar pneumonia. In many cases the history is incomplete, but of 119 cases there was an antecedent pneumonia in 104; a probable pneumonia in nine. In only four was the affection definitely primary. One case followed scarlatina and one diphtheria; in five cases measles, in one case typhoid, in one case pertussis preceded the pneumonia. In all cases so far as can be judged from the records the pneumonia was of the acute lobar type. Tuberculosis seems, in this community at least, to play a very slight rôle in causation. One case showed localized tuberculosis of the lung at autopsy. In three cases the diagnosis of tuberculosis was made clinically; in two others probable tuberculosis developed after some years, but in no case with demonstration of bacilli. There is no case in which the records definitely support a diagnosis of tubercular empyema.

[1] Read before The Massachusetts Medical Society, June 11, 1902.